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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,661	01/14/2004	Siwen Li	62020-1500	4467
24504 7590 07/10/2008 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994				
EXAMINER				
PENG, KUO LIANG				
ART UNIT		PAPER NUMBER		
1796				
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07/10/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/757,661

**Applicant(s)**

LI ET AL.

**Examiner**

Kuo-Liang Peng

**Art Unit**

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/3/08 Suppl. Amendment.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 and 14-40 is/are pending in the application.  
4a) Of the above claim(s) 1 and 14-39 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 2-12 and 40 is/are rejected.  
7) ☒ Claim(s) 12, 40 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. The Applicants' amendment and supplemental amendment filed January 24, 2008 and April 3, 2008 are acknowledged. Claim 13 is deleted. Claims 2-12 are amended. Claims 1 and 14-39 are withdrawn. Claim 40 is added. Now, Claims 2-12 and 40 are pending for consideration.
2. Claim objection(s) (except the issue associated with Claim 12) in the previous Office Action (Paper No. 081807) is/are removed.
3. Claim rejection(s) under 35 USC 112, first paragraph, in the previous Office Action (Paper No. 081807) is/are removed.
4. The text of those sections of Title 35, U.S. code not included in this action can be found in prior Office Action(s).

### ***Claim Objections***

5. Objection of Claim 12 is maintained because the rejection is adequately set forth in paragraph 5 of Paper No. 081807.

Applicants appear to inadvertently not addressing this issue.

6. Claim 40 is objected to because of the following informalities:

In Claim 40 (line 1), should “fuel” be -- fuel cell --?

***Claim Rejections - 35 USC § 112***

7. Claim 10-12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10-11 recite the limitations “-R<sup>2</sup>A” and “-R<sup>3</sup>” in Claim 10 (line 5).

There are insufficient antecedent bases for these limitations in the claims.

Claim 12 recites the limitations “-R<sup>2</sup>A” and “-R<sup>3</sup>” in line 5. There are insufficient antecedent bases for these limitations in the claims.

8. Claims 10-11 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the use of a hybrid inorganic-organic copolymer network having at least one backbone unit corresponding to [-O-Si(WX)-O-Si(YZ)-R1-O-R4-] (page 12, Structure H), does not reasonably provide enablement for a hybrid inorganic-organic copolymer network having at least one

backbone unit corresponding to [-O-Si(WX)-O-Si(YZ)-R1-O-**R4**]. (Emphases added) The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. Notably, the former structure is **divalent** in nature; while the latter is **monovalent**. They are totally distinct from each other, and would impart different properties to the matrix as a whole, i.e., the divalent species will increase the crosslinking density, hardness, brittleness, etc. of the material. On the contrary, the monovalent species will create loose dangling ends; thus, impart the opposite characteristics to the material. One of ordinary skill in the art would not find them interchangeable, equivalent or obvious variants.

9. Claim 40 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Examiner is not able to find a basis in the specification for a fuel cell that lacks a **catalyst**. Especially, Applicants does admit conventionally the need of catalyst at anode and cathode. (Specification, page 1, last paragraph to page 2, 1<sup>st</sup> paragraph) Furthermore, Applicants assert that the alleged support can also be

found in the amended “summary”. However, it is not clear as to what the **amended “summary”** refers to.

*Claim Rejections - 35 USC § 102*

10. Claims 2-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Honma340 (US 2003/0003340).

Honma340 discloses a fuel cell comprising a flexible proton electrolyte membrane comprising a hybrid inorganic-organic copolymer network derived from a composition comprising components A), B) and C). (Abstract and [0091]-[0096]) Component A) can be tetraalkoxysilanes, etc. ([0099]) Component B) can be further described in [0100]-[0103], [0118], [0120]-[0125]. Component C) can be phosphoric acid or sulfonic acid. ([0110] and [0126]-[0129]) Since Honma340’s composition reads on Applicants’ composition described in the specification, the copolymer network contains the backbone units set forth in the instant claims. The proton conductivities of the membrane are illustrated in [0081] and [0255]. Notably, there is no humidifier or thermal management system used in Honma340’s disclosure.

For Applicants’ argument (Remarks, page 14, 2<sup>nd</sup> paragraph), there is no humidifier or thermal management system used in Honma340’s disclosure, *supra*.

For Applicants' argument (Remarks, page 14, 3<sup>rd</sup> paragraph), Examiner disagrees. Honma340's component A), e.g., tetraalkoxysilane, etc. is a precursor for preparing the **disclosed** backbone units corresponding to the **claimed** backbone units where both W and X are oxygen atoms.

11. Claims 2-11 are rejected under 35 U.S.C. 102(a) as being anticipated by Honma138 (US 6 680 138).

Honma138 discloses a fuel cell comprising a flexible proton electrolyte membrane comprising a hybrid inorganic-organic copolymer network derived from a composition comprising components A), B), C) and D). (col. 4, lines 42-47) Component A) can be exemplified as bis(triethoxysilyl)butane, bis(hydrolysable-silyl)alkylene oxide, bis(hydrolysable-silyl)polyisobutylene, bis(hydrolysable-silyl)polyethylene, etc. (col. 5, line 22 to col. 6, line 53 and col. 7, line 14 to col. 8, line 2) Component B) can be exemplified in col. 8, lines 38-53 and col. 3, lines 7-23. Since Honma138's composition reads on Applicants' composition described in the specification, the copolymer network contains the backbone units set forth in the instant claims. The proton conductivities of the membrane are illustrated in Examples. Notably, there is no humidifier or thermal management system used in Honma138's disclosure.

For Applicants' argument (Remarks, page 14, last paragraph), there is no humidifier or thermal management system used in Honma138's disclosure, *supra*.

For Applicants' argument (Remarks, page 15, 2<sup>nd</sup> and 3<sup>rd</sup> paragraphs), Examiner disagrees. Honma138's component A), e.g., alkoxysilyl end-capped polyisobutylene, polypropylene oxide, etc. is a precursor for preparing the **disclosed** backbone units corresponding to the  $-\text{Si}(\text{YZ})-\text{R}^1-$ ,  $-\text{Si}(\text{YZ})-\text{R}^1-\text{O}-\text{R}^4-$  and/or  $-\text{Si}(\text{YQ})-\text{R}^1-\text{Si}(\text{YQ})-$  moieties in the **claimed** backbone units.

### *Claim Rejections - 35 USC § 103*

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honma138.

Honma138 discloses a fuel cell comprising a flexible proton electrolyte membrane, *supra*, which is incorporated herein by reference. Honma138 is silent



on the claimed network containing a short chain hydrocarbon spacer between two Si atoms and a long chain hydrocarbon spacer between another two Si atoms. However, Honma138 a bis(alkoxysilyl)-C4 to C20 alkane and a polyisobutylene or long chain PE end-capped with alkoxysilyl groups. (col. 6, lines 10-18 and col. 7, lines 14-31) The polymer can have a MW of up to 1000 (col. 7, line 55 to col. 8, line 2). Since the bis(alkoxysilyl)-C4-C20 alkane and the hydrolysable silyl PIB/PE for the same purpose (i.e., functioning as component A)) in the composition for preparing the hybrid inorganic-organic copolymer network, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to utilize both of them as component A) with expected success. See MPEP 2144.06 (I)

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory

action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kuo-Liang Peng whose telephone number is (571) 272-1091. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jim Seidleck, can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on

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access to the Private PAIR system, contact the Electronic Business Center (EBC)  
at 866-217-9197 (toll-free).

klp  
July 3, 2008

/Kuo-Liang Peng/  
Primary Examiner, Art Unit 1796